REMARKS

Status of Claims

Claims 1 to 5 and 14 to 23 have been cancelled without prejudice.

Claims 6 to 13 have been rejected under section 103.

Claim Rejections

Independent Claim 6 and its dependent claims 7 to 13 have been rejected under 35 U.S.C. 103 as being unpatentable over European Patent Application 630,864 to Takagi, in argued combination with U.S. patent 5,785,729 to Yokokawa.

Independent claim 6 has here been amended to incorporate language from claim 1, from which it depended prior to this amendment. Reconsideration of the rejection of claim 6 is respectfully requested.

Claim 6, as here amended, recites a method for producing a quartz glass article for producing an optical component. The method comprises providing a quartz glass cylinder having an inner bore and the steps of mechanically treating the inner bore to a final dimension and then applying an etching treatment to the inner bore. Mechanically treating the inner bore comprises a plurality of removal processes each with a successively smaller removal depth, such that the inner bore has subsurface cracks therein, and all of the subsurface cracks in the inner bore have depths of not more than 2 mm after the last removal process. The inner bore is subsequently subjected to the etching treatment so as to produce an etching removal with a depth of not more than 50 μm, and so that the inner bore has an etched structure that has cracks,

and all of the cracks have a depth of not more than 2.0 mm and a width of not more than 100 μm.

The claimed method yields a hollow cylinder that is particularly advantageous for producing a preform from a cylinder and a core rod without encountering a problem of bubbles encountered with prior art methods.

Takagi recites a method for producing optical fibers from a column preform of silica glass. See Takagi, col. 1, lines 32-36. In Takagi, an ultrasonic drill bores through-holes 5, 6 in the preform. See Takagi, col. 11, lines 45-47. A honing machine is then used to polish the inner walls of the through-holes to a maximum roughness of about 0.5 μm. See Takagi, col. 11, lines 55-58.

The mechanical boring of the Takagi process results in the inner walls containing crack grooves 50 that are formed by the drilling of the through-holes, and there are impurities 51 in these open cracks. See Takagi, col. 12, line 57 to col. 13, line 5. See also, FIG. 11. To remove these impurities, the drilled holes 5, 6 are exposed to the corrosive action of hydrofluoric acid to slightly etch the inner walls. Takagi, col. 13, lines 12 to 15; see also FIG. 14. After this cleansing with HFl, the inner surfaces are flame polished. Takagi, col. 14, lines 36 to 39.

Takagi describes open cracks caused by the drilling of the through-holes 5 and 6. However, Takagi says nothing about the mechanical treatment that would suggest that any **subsurface** cracks of any size are present, or that the mechanical treatment should be a plurality of removal processes, each with a successively smaller removal depth, such that all of the subsurface cracks in the inner bore have depths of not more than 2 mm after the last removal process. The limitation of the depth of these subsurface cracks is important to securing the

benefits of the claimed method. See e.g., the present application as published, US 2006/0137401 A1, para. 0022.

Takagi is also silent on the maximum removal depth of the etching process, which according to the claimed method is not more than 50 μm. Keeping the removal depth of not more than 50 μm results in the width of the cracks after etching being of an acceptable dimension. See present application as published, US 2006/0137401 A1, para. 0030.

The Examiner misreads Takagi col 4, lines 9 -17, which describes the second step (etching with HFl) being to a roughness of 0 to 2 μm, as teaching an etching treatment with a maximum removal depth of not more than 50 μm. Even if the etching process removed a depth of hundreds of micrometers, much more than 50 μm, the resulting surface still might well have a very small surface roughness.

In summary, as the Examiner has conceded, Takagi does not teach a plurality of mechanical removal process with successively smaller removal depths that result in subsurface cracks not greater than 2 mm, and also does not suggest that any etching be such that the maximum removed depth is 50 μm or less. Takagi therefore fails to suggest a method as claimed, which produces a cylinder with an inner bore especially beneficial for a rod-in-cylinder process.

Yokokowa (U.S. patent 5,785,729) is believed to be the U.S. counterpart of EP 0 598 349 A1, which is discussed in detail in the present application specification. See, US 2006/0137401 A1, paras. 0009 and 0013-0014.

Yokokowa recites a method for producing an optical preform for the manufacture of optical fibers from a thick-walled quartz glass cylinder with a central tubular inner surface. The

inner bore is brought to highly accurate dimensions by drilling, etching and washing. Yokokawa, abstract, lines 1 to 4; see also FIG. 6. The resulting quartz glass tube is combined with a core glass rod using the rod-in-tube technique to form the preform. See, e.g., col. 2, lines 59 to 67.

Yokokawa does not make any mention of ***subsurface*** cracks in the inner surface of the tube, let alone any limit on their depth after machining the tube. Yokokawa is focused rather on the smoothness of the inner surface as an indicator of reduced bubble formation. See, e.g., Yokokawa, col. 8, lines 49 to 54. In fact, the Yokokawa method, as set out in the present application specification, is directed to deriving a better preform by reducing surface roughness, but, in fact, Yokokawa's focus on the inner surface smoothness has been found **not** to correlate with the quality of the resulting boundary surface in a preform made by that method. See, the present application as published, US 2006/0137401 A1, para. 0014. Detailed studies have shown that the Yokokawa method produces subsurface cracks that may be quite large. See, *id.* para. 0016 and 0017.

Yokokawa also does not suggest that the etching of its process be restricted to a removal depth that is not greater than 50 μm.

Therefore, neither Takagi nor Yokokawa suggest a method as set out in claim 6 with the resulting benefits of the invention. Reconsideration of the rejection of claim 6 is therefore respectfully requested.

Claims 7 to 13 and new dependent claim 24 depend directly or indirectly from claim 6 and therefore distinguish therewith over the cited prior art.

All claims having been shown to distinguish over the prior art in structure, function and result, formal allowance is respectfully requested.

Should any questions arise, the Examiner is invited to telephone attorney for applicants at 212-490-3285.

Respectfully submitted,

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